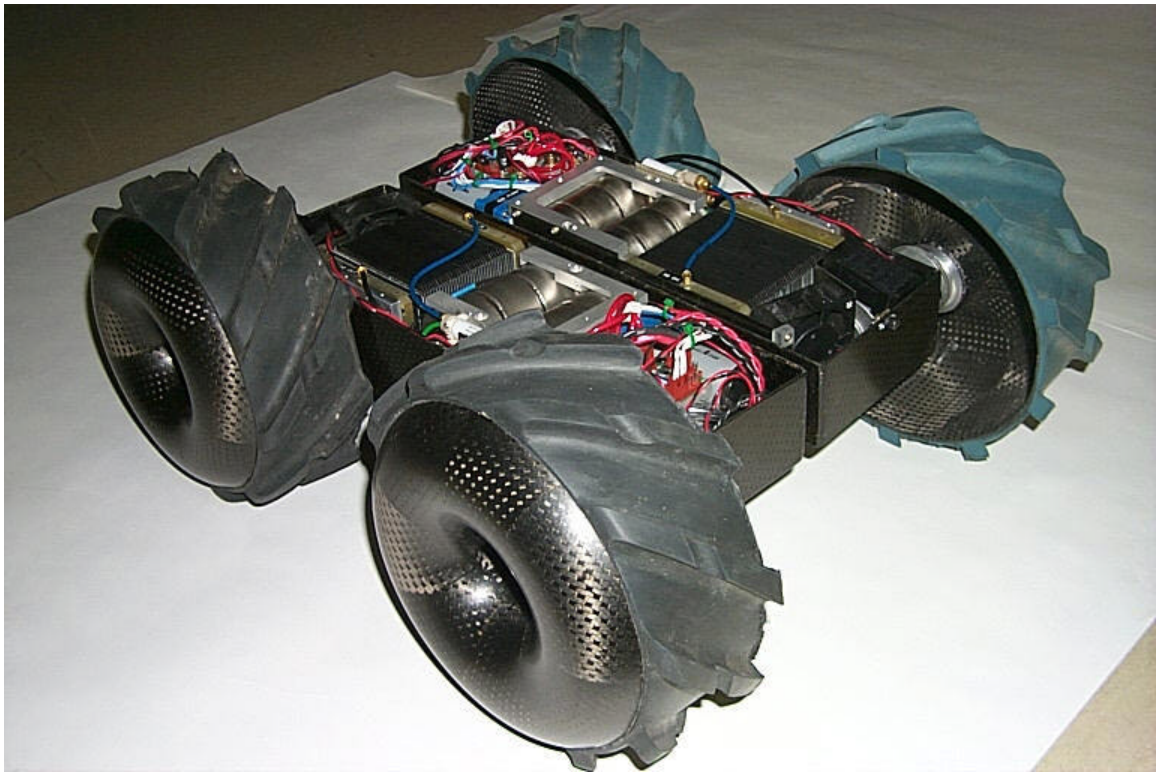
Automated system for nuclear material handling developed in record time.

RoboCal is a nuclear material handling system installed at Los Alamos National Laboratory that transports material between storage units, assay instruments, and an operator depot. The system, developed by 15272, operates 24/7 coordinating robotic motion, storage unit activity, assay instruments, and data collection. A DOE readiness assessment has been completed and the system will go “hot” after seismic issues in the legacy storage units have been addressed. The system was developed and shipped in 8 months.

New power option increases operational efficiency.

We integrated and tested a fuel cell power system on a robotic vehicle, an industry first. The fuel cell combines hydrogen and oxygen at low temperature (~60C) without combustion to produce electricity at high efficiency (50% gross), potentially offering much greater operational range than batteries presently used. In collaboration with the Fuel Cell Propulsion Institute, Sandia combined an H-Power Corporation stack with a hydride bed hydrogen storage unit developed at Sandia Livermore. The team consists of Alex Maish, Paul Klarer, Clint Hobart (15252), and Paul Baca (6245).



Ground breaking system delivered to meatpacking customer.

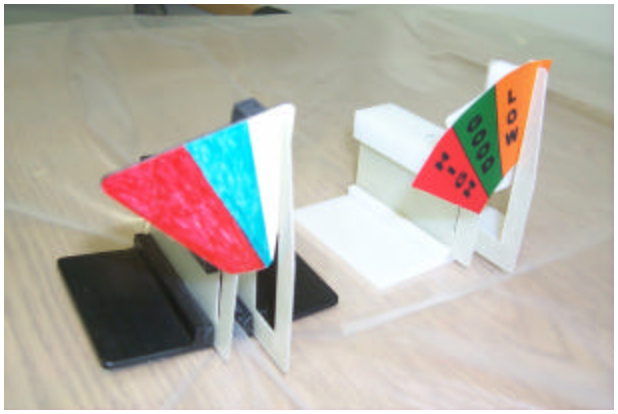
By integrating Sandia-developed sensing, cutting, and contour generating technologies, a cross-organizational team led by the Robotics Center's Department 15272, successfully demonstrated automated meat cutting for a CRADA sponsor, IBP. In September the prototype device was shipped to IBP for further testing and development. The shipment marks Sandia's successful completion of all technical tasks initially enumerated in the CRADA ... approximately one and a half years ahead of schedule and under budget! SNL and IBP have filed numerous technical disclosures and patent applications as a result of this work.

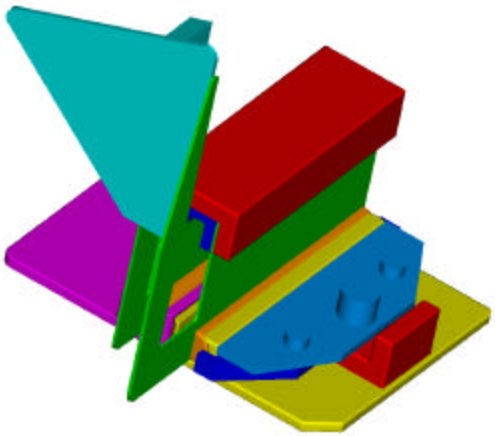
New mobility platform takes a giant leap forward.

Reliable, autonomous mobility in difficult environments has previously eluded robot engineers. Department 15211's DARPA-funded work, led by Rush Robinett, developed a hopping machine that may soon give robots unprecedented mobility for exploring other planets, gathering war-fighting intelligence, and assisting police during standoff or surveillance operations. Most mobile robots are designed to steer directly to a spot and require expensive and complicated control systems. Over long distances you don't need as much precision, so semi-random mobility is sufficient for many applications.

Medical device eases patient recovery.

A newly patented pressure indicator designed specifically for a medical application was licensed to the CRADA partner, Numotech. It monitors the pressure within the Topical Hyperbaric Oxygen Therapy enclosure used to treat hard-to-heal wounds including burns, diabetic ulcers, and pressure sores. Requirements included no electricity, cheap, disposable, no enclosure penetration, no calibration, and readable from several meters. The entire pressure range is a few inches of water. FDA has approved use of the device. Keith Miller and Mark Vaughn (both 15252) are co-inventers.





Robotic system planning made easier for users.

The Intelligent Systems and Robotics Center, Department 15221 has applied modern techniques in algebraic topology and other mathematical areas to manipulation planning. Our new results have allowed us to design provably optimal, complete algorithms for a certain class of problems previously thought to be intractable. In addition, we have developed new user interface technologies that allow the operator to draw on video images to program robot tasks. These two developments are being synergistically combined to further simplify robot control, possibly allowing people to control several robots simultaneously.

Automated system seals, tests, and monitors a nuclear material handling process.

The Automated Glovebox CanOut system automates a portion of the process that packages nuclear material in welded stainless steel containers for long-term storage at the Los Alamos National Laboratory plutonium processing facility. Two robots inside a glovebox are used to enclose a convenience can with nuclear material inside a stainless steel container, weld it, and perform leak tests, decontamination, and radiation monitoring on it. The system developed by 15200 and 2900, was delivered in April 2000 and is being integrated with LANL components and prepared for hot operations.